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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,659	03/24/2004	Doo-Hoon Goo	8836-229 (IE12193US)	4316

22150 7590 05/31/2007

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EXAMINER	
GUTIERREZ, KEVIN C	

ART UNIT	PAPER NUMBER
2851	

MAIL DATE	DELIVERY MODE
05/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/807,659	GOO ET AL.	
	Examiner	Art Unit	
	Kevin Gutierrez	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks, filed March 28, 2007, with respect to the amended claim(s) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. Further, the Applicants amendments to the abstract have been considered and are persuasive. The objection to the specification has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art.

The Examiner maintains the primary art as Miura et al. for disclosing a light source device for generating a light having wavelength of about 315 nm to 400 nm (col. 6, line 54, where a lamp being used emits UV radiation, which the UV spectrum encapsulates 315 nm to 400 nm, see provided reference or visit http://www.uvminerals.org/spectrum.htm). The Miura et al. reference does not disclose a wavelength converter to convert the light source to a wavelength of about 193 nm. However, the Examiner relies on Ohtsuki et al. to cure the deficiencies of Miura et al. to disclose the claimed invention as stated below in the rejections.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject

matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 7-9, 17, 20-22, 25-27, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. (6,052,173) in view of Ohtsuki et al. (6,078,598).

Regarding claims 1, 3, 17 and 21, Miura et al. disclose "a light source device (fig. 1, LH1; Light source) for generating source light having a wavelength of about 315 nm to 400 nm (col. 6, line 54-58, where a lamp emits UV radiation, which encapsulates 315 nm to 400 nm);

an optical fiber cord (LF1; optical fiber) for guiding the source light generated from the light source device (LH1) into a light focusing device (LO1; exposure light exit part);

a lens (fig. 7a; L1 or L2) positioned in the light focusing device (LO1) to receive the source light from the optical fiber cord (LF1), the light focusing device (LO1) to focus the source light to the edge of a wafer (W; col. 6, lines 65-67 through col. 7, line 1; figure 7); and a wavelength corresponds to the highest absorptivity of a photoacid generator of resist coated on the wafer (col. 1, lines 42-4, where exposure light turns the resist).

Miura et al. does not disclose (claims 1 and 17) "a wavelength converter for converting the wavelength of the source light to wavelength of about 193 nm" and (claims 3 and 21) "wherein the wavelength converter is made of an optically non-linear material."

However, Ohtsuki et al. teach a wavelength converter (2; optical element), which uses a non-linear optical crystal to convert light of wavelength 386 nm to a wavelength of 193 nm (col. 14, lines 23-25) utilized in an exposure apparatus. Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the apparatus of Miura et al. by including a wavelength converter of an non-linear optical material utilized in a manner described above for at least the purpose of reducing energy loss).

Regarding claims 2 and 20, Miura et al. further disclose "wherein the light source device includes a lamp, a parabolic or elliptical mirror, a plate, a shutter (SH1), and a filter (col. 6, lines 54-57)."

Regarding claims 7-8 and 25-26, Miura et al. further disclose (claims 7 and 25) "wherein the source light is i-line" and (claims 8 and 26)"is one of lights having a wavelength within the ultraviolet range (col. 6, lines 53-54, where the light source use is in the UV range emitting UV radiation)."

Regarding claims 4, 9, 22, and 27, Miura et al. as modified disclose an optically non-linear material, but does not disclose "wherein the optically non-linear material is one selected from the group consisting of beta barium borate (β-BaB_2O_4), lithium triborate (LiB_3O_5), cesium lithium borate ($CsLiB_6O_{10}$), potassium titanyl phosphate ($KTiOPO_4$), potassium titanyl arsenate ($KTiOAsO_4$), potassium dihydrogen phosphate (KH_2PO_4), deuterated ammonium dihydrogen phosphate (KD_2PO_4), ammonium dihydrogen phosphate ($NH_4H_2PO_4$), deuterated ammonium dihydrogen phosphate ($ND_4H_2PO_4$), rubidium dihydrogen phosphate (RbH_2PO_4), cesium dihydrogen arsenate

(CsH_2AsO_4), deuterated cesium dihydrogen arsenate (CsH_2AsO_4), lithium niobate ($LiVbO_3$), lithium tantelate ($LiTaO_3$), lithium iodata ($LiIO_3$), potassium niobate ($KNbO_3$), barium nitrate ($Ba(NO_3)_2$), solid-state raman shifters ($KGd(W0_4)_2$), potassium pentaborate, 3-methyl-4-nitropyridine-1 oxide, L-ariginine phosphate, and combinations thereof (col. 3, lines 2-4, where the wavelength converter can be formed of $LiIO_3$)."

However, Ohtsuki et al. teach a wavelength converter utilizing a BBO crystal (also referred to as β-BaB_2O_4; col. 14, lines 22-25) or a KTP crystal (also referred to as $KTiOPO_4$; col. 14, lines 41-43). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the non-linear material of Miura et al. as modified to have it made of at least β-BaB2O4, KTiOPO4, or any of the aforementioned compounds for at least the purpose of reducing production cost.

Regarding claim 31, Miura et al. as modified disclose the limitations as set forth in claims 1 and 9

4. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in view of Ohtsuki et al. as applied to claims 1 and 17 above, and further in view of Tanaka et al. (5,811,211). The teachings of Miura et al. and Ohtshuki et al. have been discussed above.

Regarding claims 5 and 23, Miura et al. as modified disclose a resist, but does not disclose "wherein the resist is ArF resist."

However, having "wherein the resist is ArF resist" is known to the art as it is evident by the teaching of Tanaka et al. (col. 19, lines 40-42, where the resist is associated with the laser's wavelength). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the resist of Miura et al. as modified by having an ArF resist for at least the purpose of obtaining an image, since Miura et al. discloses a UV exposure source.

5. Claims 6, 10-14, 18-19 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in view of Ohtsuki et al. as applied to claims 1 and 17 above, and further in view of Yamamoto et al. (4,905,037). The teachings of Miura et al. and Ohtshuki et al. have been discussed above.

Regarding claims 6 and 24, Miura et al. as modified discloses a lamp that emits UV radiation (col. 6, line 54), but does not disclose "wherein the lamp is a mercury arc lamp."

However, Yamamoto et al. teach "wherein the lamp is a mercury arc lamp (col. 6, lines 50-51)." Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify lamp of Miura et al. as modified by having the lamp as a mercury arc lamp for at least the purpose of utilizing UV radiation and reducing production costs.

Regarding claims 10-14, 18-19 and 28, Miura et al. as modified disclose the claimed invention except for (claims 10 and 18-19) "wherein the wavelength converter is positioned in front of the lamp," (claim 11) "wherein the wavelength

converter is positioned between the optical fiber cord and the filter," (claim 12) "wherein the wavelengths converter is positioned between the lens and the optical fiber cord," (claim 13) "wherein the wavelength converter is installed at the end of the light-focusing device," and (claims 14 and 28) "wherein the wavelength converter is attachable/removable)."

However, having the wavelength converter being attachable/removable to be placed in the specific aforementioned positions above is known to the art as it is evident by the teaching of Yamamoto et al. (see abstract, where the converter is disposed in a light path between a light source and a photosensitive medium. Further, figures 8-9, 17 and 22 correspond to similar positions for placing the wavelength converter in an image transfer system). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the apparatus of Miura et al. by having a wavelength converter attachable/removable to be positioned in a manner described above for at least the purpose reducing production costs.

6. Claims 15-16 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in view of Yamamoto et al., as applied to claims 1 and 17 above, and further in view of Minemoto et al. (5,381,429).

Miurat et al. as modified disclose a wavelength converter, but does not disclose (claim 15) "wherein an anti-reflective coating film (ARC) is coated on surface of the wavelength converter" and (claim 16) "wherein the anti-reflective coating film (ARC)

is made of one selected from the group consisting of zirconia (ZrO_2), magnesia (MgO), silica (SiO_2), titania (TiO_2), and combinations thereof."

However, having a wavelength converter with an anti-reflective coating consisting of one compound from above is known to the art as it is evident by the teaching of Mimemoto et al. (col. 8, lines 4-9, where the anti-reflective coating of SiO_2 is applied to a wavelength converter). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the wavelength converter of Miura et al. as modified to include an anti-reflective coating and utilized in a manner described above for at least the purpose to transmit wavelengths of higher harmonics.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nishi (US 2003/0081192) discloses a wavelength converter producing light in less than 200 nm.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 8:00 a.m. - 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571)-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin Gutierrez
Examiner
Art Unit 2851

May 23, 2007

Rodney Fuller
Primary Examiner